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(54) **EASY POUR SPOUT**

USPC 222/541.9, 575; 220/272, 273, 270;
D9/438, 763, 518

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See application file for complete search history.

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(57) **ABSTRACT**

(52) **U.S. Cl.**

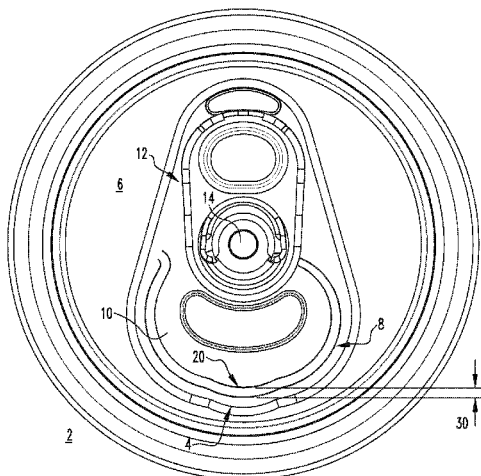
CPC **B65D 47/106** (2013.01); **B65D 17/165**
(2013.01); **B65D 2517/0014** (2013.01); **B65D**
2517/0062 (2013.01); **B65D 2517/0089**
(2013.01)

A can end is provided, which includes a center panel having
a radius, a tab fastened to the center panel, and a scoreline
defining a tear panel in the end panel. The tab is operable to
sever the scoreline and open the tear panel to provide an
opening in the can end. The tear panel includes an enlarged
portion extending outwardly toward the center panel radius,
thereby enlarging the opening. The enlarged portion forms an
easy pour spout.

(58) **Field of Classification Search**

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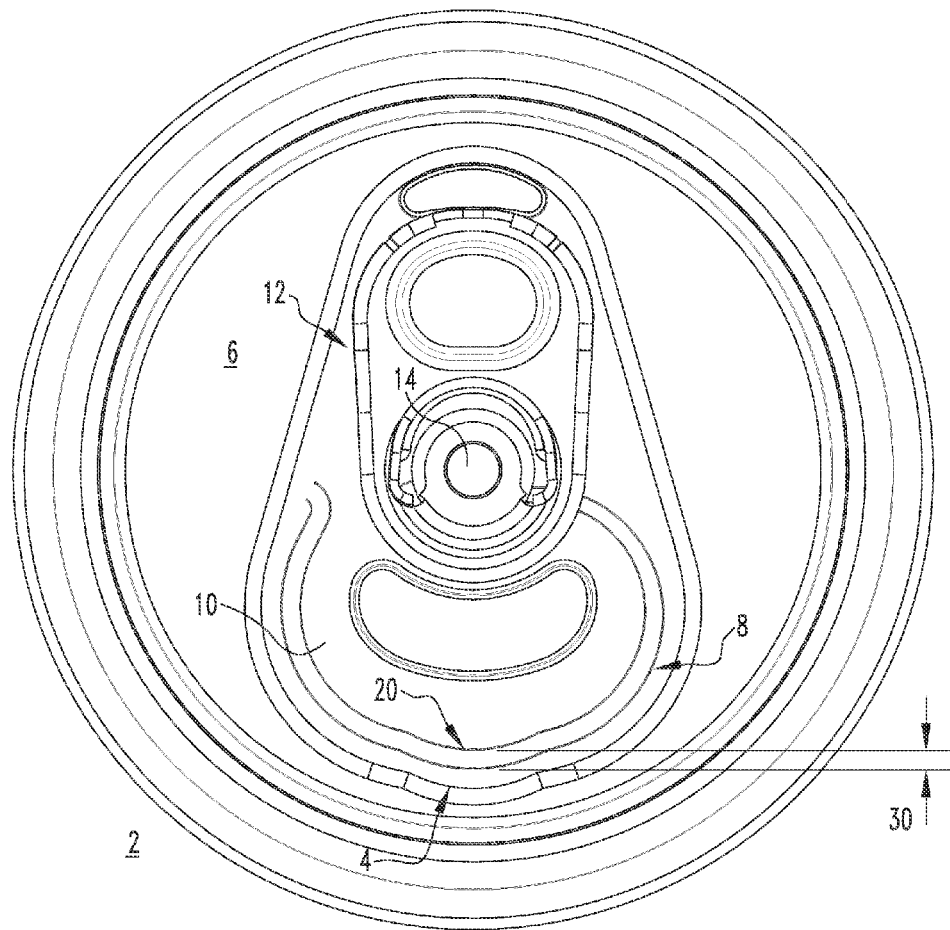
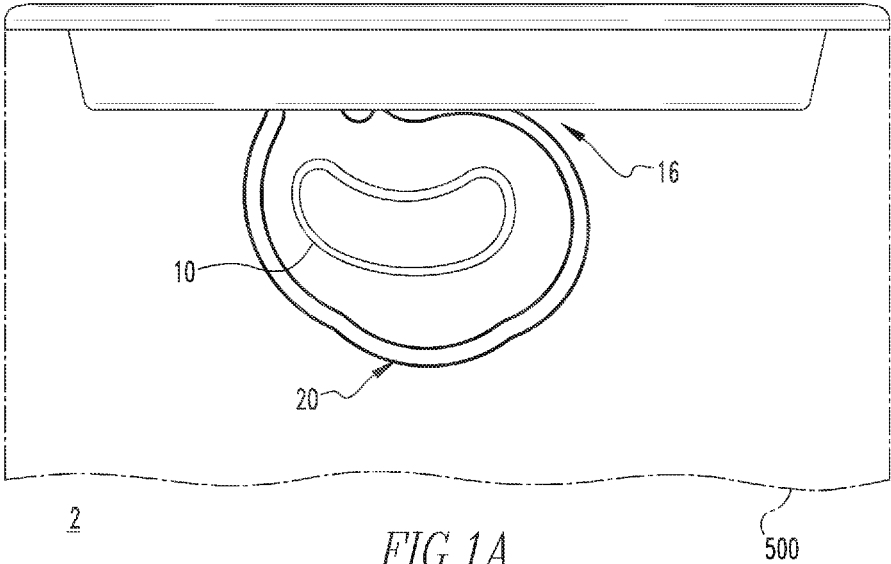


FIG. 1



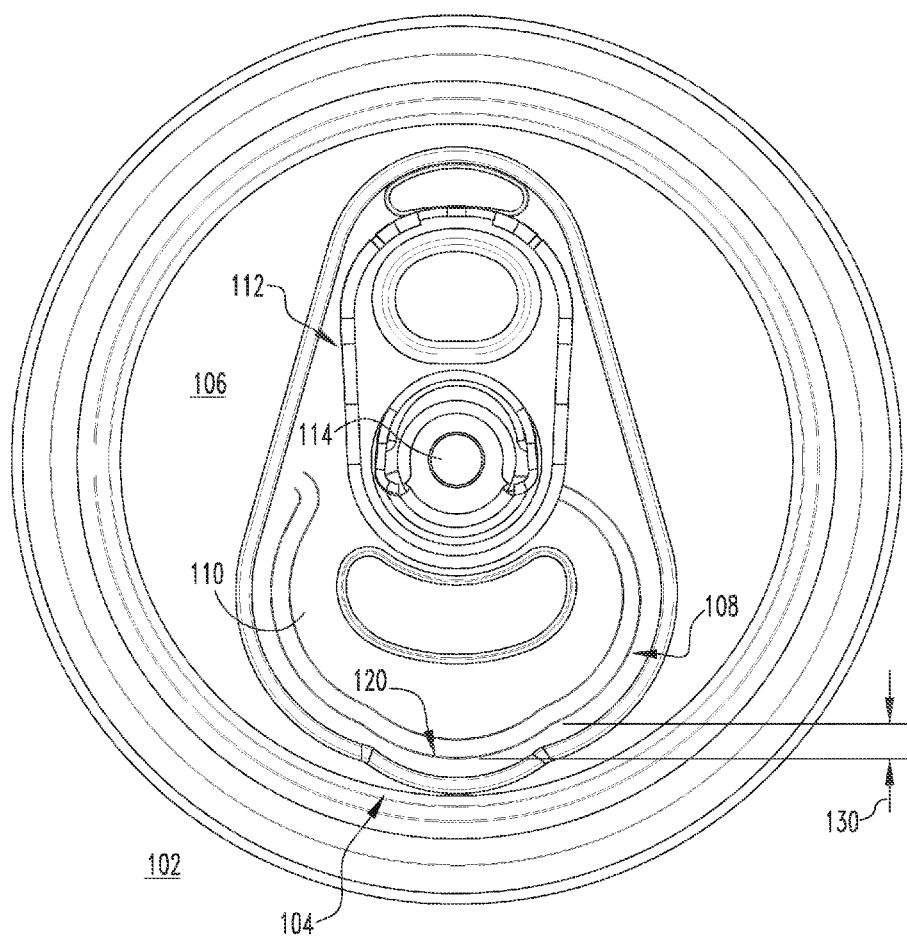
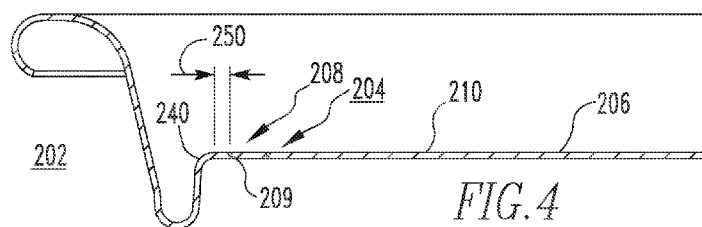
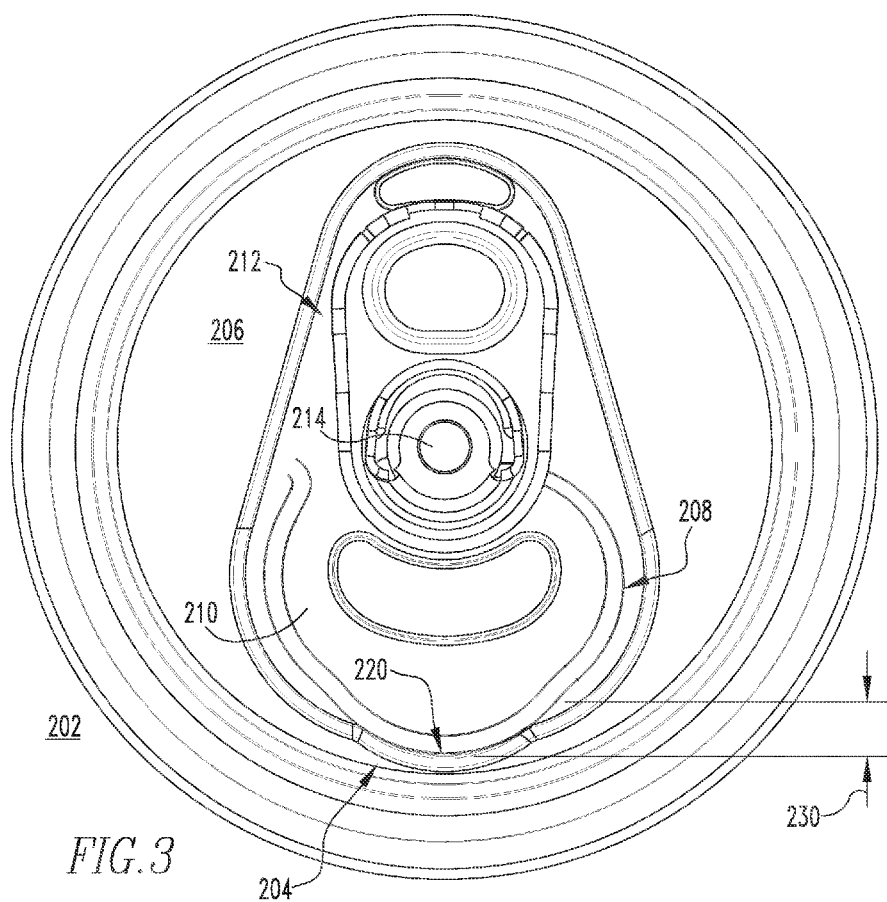
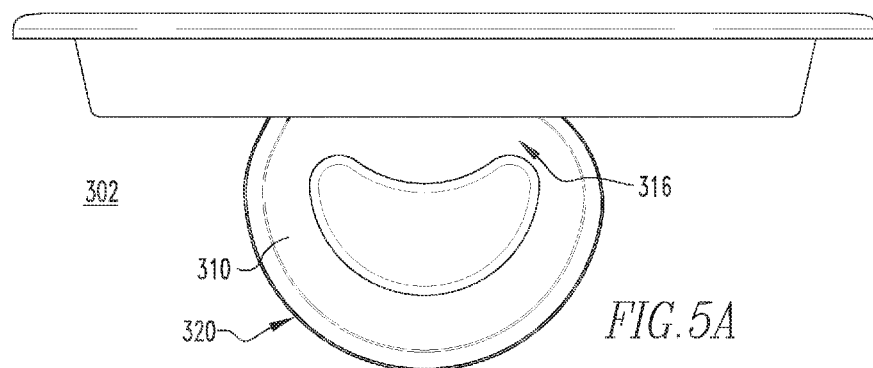
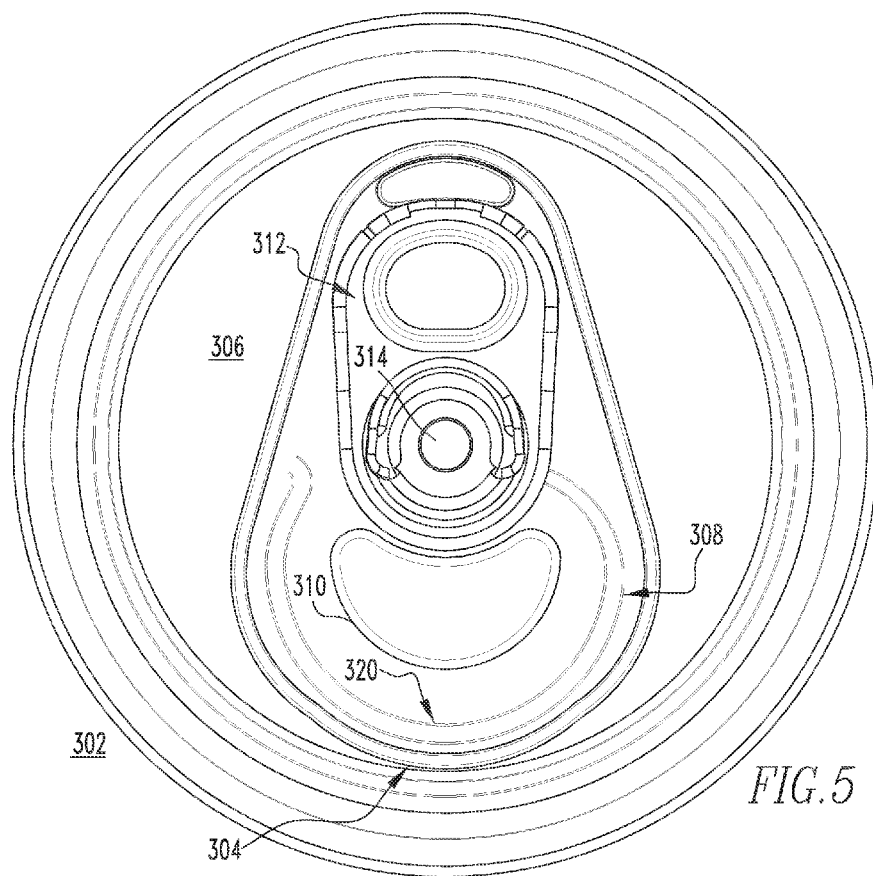
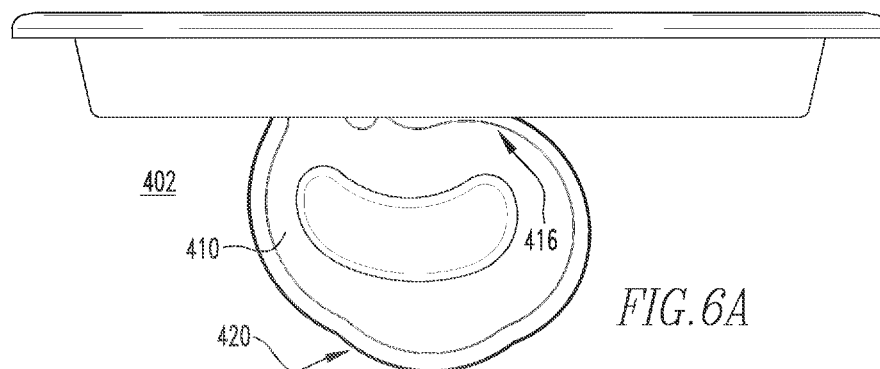
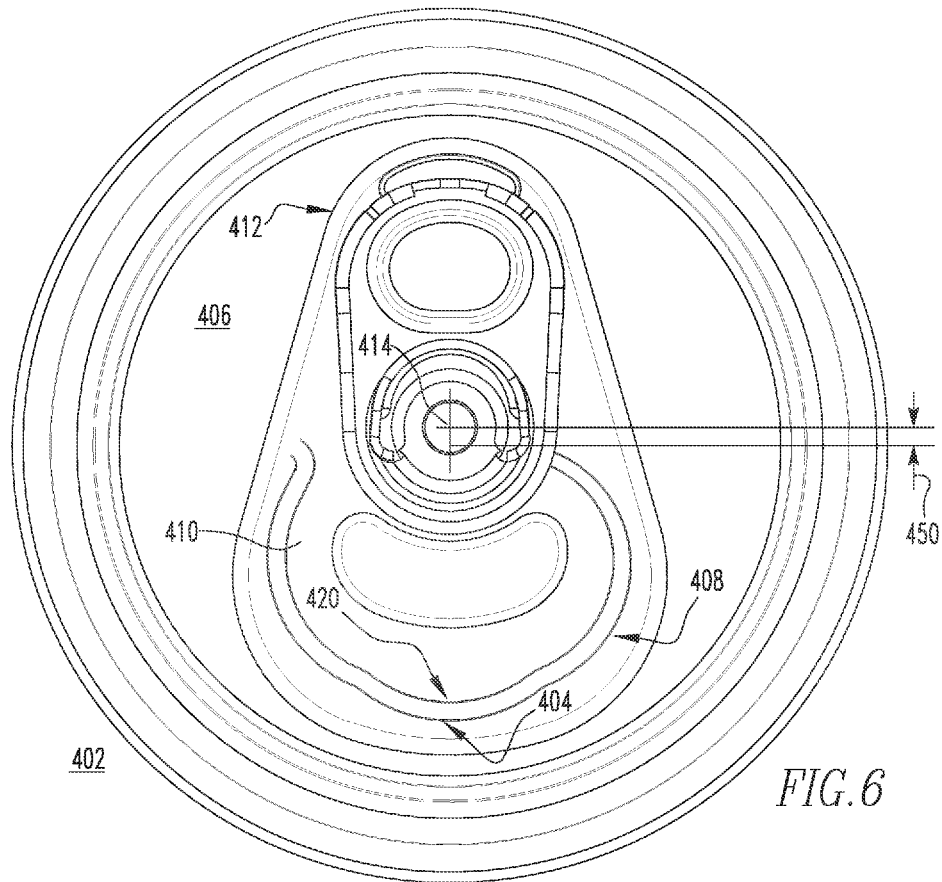
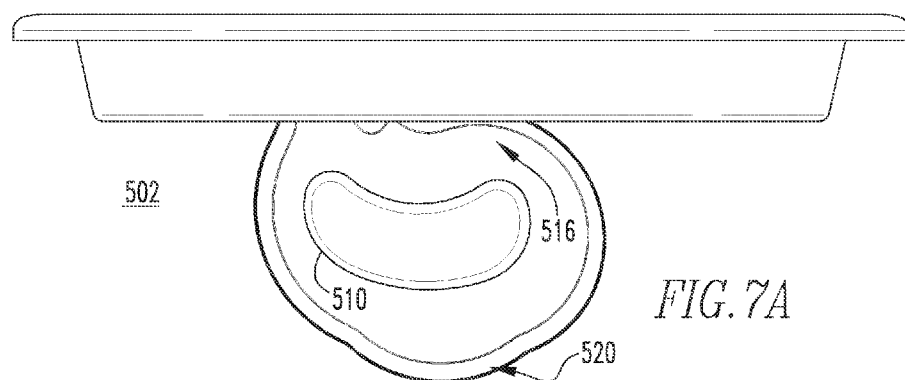
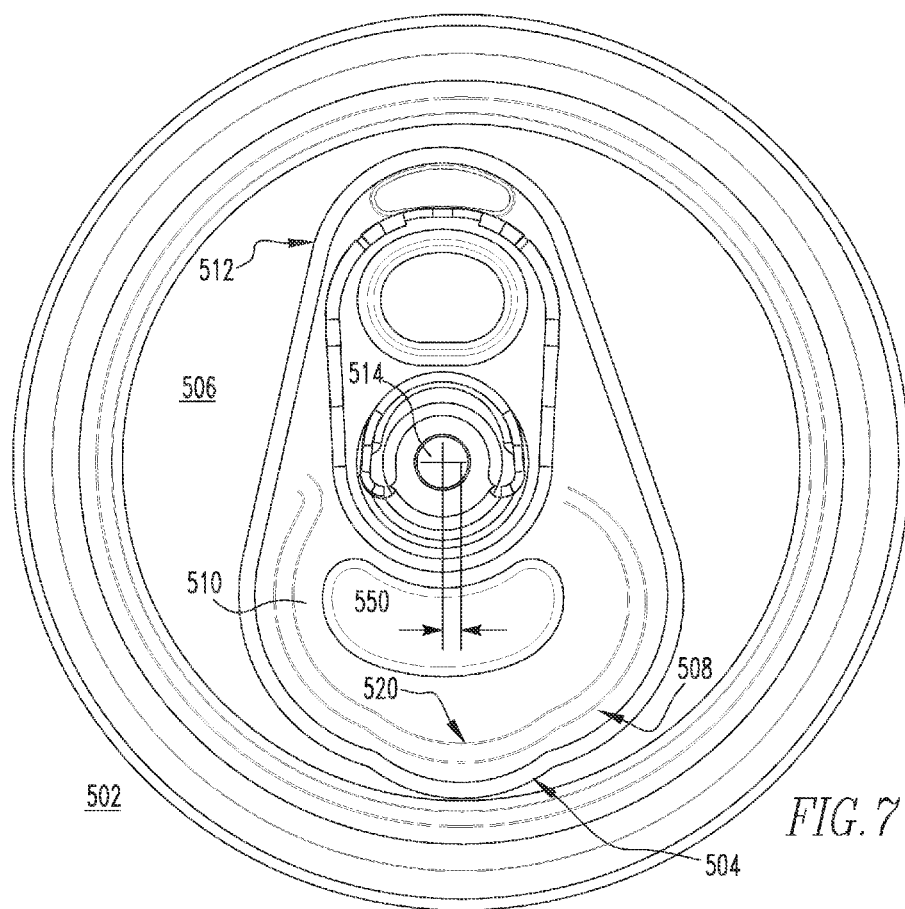


FIG. 2









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EASY POUR SPOUT

CROSS-REFERENCE TO RELATED APPLICATION

This patent application claims the priority benefit wider 35 U.S.C. §119(e) of U.S. Provisional Application No. 61/692, 743 filed on Aug. 24, 2012, and entitled, "EASY POUR SPOUT," the contents of which are hereby incorporated herein by reference.

BACKGROUND

1. Field

The disclosed concept relates generally to containers and, more particularly, to can ends for containers, such as beer and beverage cans. The disclosed concept also relates to an easy pour spout for can ends.

2. Background Information

Metallic containers (e.g., cans) for holding products such as, for example, liquids, beverages, or food products, are typically provided with an easy open can end on which an opening mechanism, such as a pull tab, is attached (e.g., without limitation, riveted) to a tear strip or severable panel. Typically, the tear strip is defined by a scoreline in the exterior surface (e.g., public side) of the can end. The pull tab, commonly referred to simply as the "tab," is structured to be lifted, pulled, and/or rotated to sever the scoreline and deflect the tear strip, thereby creating an opening for dispensing the contents of the can.

When the can end is made, it originates as a can end shell, which is formed from a sheet metal product (e.g., without limitation, sheet aluminum; sheet steel). The shell is then conveyed to a conversion press, which has a number of successive tool stations. As the shell advances from one tool station to the next, conversion operations such as, for example and without limitation, rivet forming, paneling, scoring, embossing, tab securing and tab staking, are performed until the shell is fully converted into the desired can end and is discharged from the press. Typically, each tool station of the conversion press includes an upper tool member, which is structured to be advanced towards a lower tool member upon actuation of a press ram. The shell is received between the upper and lower tool members. Thus, as the upper tool member engages the shell, the upper and/or lower tool members respectively act upon the public and/or product (e.g., interior side, which faces the can body) sides of the shell, in order to perform a number of the aforementioned conversion operations. Upon completion of a given operation, the press ram retracts the upper tool member and the partially converted shell is moved to the next successive tool station, or the tooling is changed within the same station, to perform the next conversion operation.

In the canmaking industry, there is an ongoing desire to improve the rate and manner in which the contents of the container are dispensed. With respect to beverage cans, the can end design can significantly impact the pour characteristics of the can. The opening of a conventional large open end (LOE), for example, is generally not large enough to allow sufficient air to displace the liquid volume, and subsequent vacuum, as the liquid is poured from the container. That is, as the liquid leaves the container, air is entrained through the primary pour opening causing a pressure differential between the interior and exterior of the can, thereby forming the aforementioned vacuum behind the liquid. This, in turn, creates fluid turbulence and interrupted or discontinuous flow. As a result, "glugging" and/or splashing, a slower than desired

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pour or flow rate, and/or excessive carbonation or foaming of the dispensed liquid, can occur.

Prior proposals for addressing these issues employ a plurality of additional openings or other mechanisms or can end features in an attempt to vent the can end. Among other disadvantages, such can end designs are relatively complex and costly and/or require an additional separate tool (e.g., without limitation, church key; bottle opener; screw driver) or object (e.g., without limitation, key), and/or require a plurality of opening operations.

There is, therefore, room for improvement in can ends for containers, such as beer and beverage cans, and in openings therefor.

SUMMARY

These needs and others are met by embodiments of the disclosed concepts, which are directed to an easy pour spout for containers, such as for example, beer and beverage cans.

As one aspect of the disclosed concept, a can end comprises: a center panel having a radius; a tab fastened to the center panel; and a scoreline defining a tear panel in the end panel; the tab being operable to sever the scoreline and open the tear panel to provide an opening in the can end. The tear panel includes an enlarged portion extending outwardly toward the center panel radius, thereby enlarging the opening.

The enlarged portion may form an easy pour spout. The easy pour spout may be disposed at or about the outer edge of the opening and substantially in the center of the opening.

The enlarged portion may comprise an arcuate extension portion extending toward the center panel radius by a predetermined distance.

The center panel may include a rivet, wherein the tab is fastened to the center panel by the rivet. The rivet may be offset with respect to the center of the can end when viewed from a top plan perspective.

As another aspect of the disclosed concept, a container is provided which employs the aforementioned can end.

BRIEF DESCRIPTION OF THE DRAWINGS

A full understanding of the disclosed concept can be gained from the following description of the preferred embodiments when read in conjunction with the accompanying drawings in which:

FIG. 1 is a top plan view of a can end including an easy pour spout, in accordance with an embodiment of the disclosed concept;

FIG. 1A is a side elevation view of the can end of FIG. 1, showing the can end after the tear panel has been opened;

FIG. 2 is a top plan view of the can end including an easy pour spout, in accordance with another embodiment of the disclosed concept;

FIG. 3 is a top plan view of the can end including an easy pour spout, in accordance with another embodiment of the disclosed concept;

FIG. 4 is an enlarged side section view of a portion of the can end of FIG. 3;

FIGS. 5 and 5A are top plan and side elevation views, respectively, of a can end and easy pour spout therefor, in accordance with another embodiment of the disclosed concept;

FIGS. 6 and 6A are top plan and side elevation views, respectively, of a can end and easy pour spout therefor, in accordance with another embodiment of the disclosed concept; and

FIGS. 7 and 7A are top plan and side elevation views, respectively, of a can end and easy pour spout therefor, in accordance with another embodiment of the disclosed concept.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

For purposes of illustration, embodiments of the disclosed concept will be described as applied to can ends for beverage/beer cans, although it will become apparent that they could also be employed to other containers such as, for example and without limitation, cans for liquids other than beer and beverages, and food cans.

It will be appreciated that the specific elements illustrated in the figures herein and described in the following specification are simply exemplary embodiments of the disclosed concept, which are provided as non-limiting examples solely for the purpose of illustration. Therefore, specific dimensions, orientations and other physical characteristics related to the embodiments disclosed herein are not to be considered limiting on the scope of the disclosed concept.

Directional phrases used herein, such as, for example, clockwise, counterclockwise, left, right, front, back, top, bottom, upper, lower and derivatives thereof, relate to the orientation of the elements shown in the drawings and are not limiting upon the claims unless expressly recited therein.

As employed herein, the terms “can” and “container” are used substantially interchangeably to refer to any known or suitable container, which is structured to contain a substance (e.g., without limitation, liquid; food; any other suitable substance), and expressly includes, but is not limited to, food cans, as well as beverage cans, such as beer and soda cans.

As employed herein, the term “can end” refers to the lid or closure that is structured to be coupled to a can, in order to seal the can.

As employed herein, the term “can end shell” is used substantially interchangeably with the term “can end.” The “can end shell” or simply the “shell” is the member that is acted upon and is converted by the disclosed tooling to provide the desired can end.

As employed herein, the term “center panel radius” refers to the radius of the curved or rounded portion at the periphery of the center panel.

As employed herein, the statement that two or more parts are “coupled” together shall mean that the parts are joined together either directly or joined through one or more intermediate parts.

As employed herein, the term “number” shall mean one or an integer greater than one (i.e., a plurality).

FIG. 1 shows a can end 2 including an easy pour spout 4, in accordance with one non-limiting embodiment of the disclosed concept. The can end 2 includes an end panel or center panel 6 and a scoreline 8, which defines a tear panel 10 in the center panel 6. A tab 12 is fastened to the can end 2, for example and without limitation, by a rivet 14, and is structured to be actuated (e.g., without limitation, lifted and pivoted) to sever the scoreline 8 about the tear panel 10, and depress the tear panel 10 downward (FIG. 1A), thereby providing an opening 16 (see, for example, primary pour opening 16 partially shown in FIG. 1A) in the can end 2 for dispensing the contents of the container or can 500 (partially shown in simplified form in phantom line drawing in FIG. 1A) to which the can end 2 is affixed. However, unlike the primary pour openings (not shown) of convention can end designs, the disclosed opening 16 includes an enlarged portion forming the aforementioned easy pour spout 4. Specifically, as will be

discussed in greater detail herein, the tear panel 10 includes an enlarged portion 20 that extends outwardly toward the center panel radius (see, for example, center panel radius 240 of FIG. 4), thereby enlarging the pour opening 16. Thus, the disclosed concept advantageously provides a larger opening aperture to address known pouring issues such as “glugging” and inconsistent and/or interrupted pouring or flow rate. Specifically, it has been discovered that the location of the enlarged portion 20 of the disclosed pour spout 4 (see also, without limitation, pour spouts 104, 204, 304, 404 and 504 in FIGS. 2, 3, 5, 6 and 7, respectively) allows the pour opening area to be further increased, without making a significant impact on opening forces, characteristics and/or performance.

Continuing to refer to FIG. 1, the easy pour spout 4 of the example can end is preferably disposed at or about the 6 o'clock position (e.g., without limitation, the bottom center from the top plan view perspective of FIG. 1) of the can end opening 16. In other words, the opening 16 includes an outer edge (e.g., edge disposed closest to the outer perimeter of the can end). The spout 4 is preferably located in the center of this outer edge, as shown. In addition to enlarging the opening 16, the spout 4 also advantageously allows the fluid to exit closer to the center panel radius (i.e., closer to the edge of the can end 2). This, in turn, allows for a larger opening area (e.g., gap or space) near the 12 o'clock position e.g., top center of the opening 16 from the top plan view perspective of FIG. 1), near the rivet 14. More specifically, more open space is provided in this area to more freely entrain air as the fluid exits the pour opening 16. In this manner, the easy pour spout 4 also serves to help relieve the back pressure and vacuum known to form behind the fluid leaving the container 500 (FIG. 1A).

Accordingly, the disclosed easy pour spout 4 enlarges only a portion of the opening 16 and consequently offers a number of advantages over prior proposals that simply attempted to make the primary pour opening larger all the way around. Among other problems, such designs put undue stress on the tab and can result in higher opening forces and opening failures. The easy pour spout 4, on the other hand, allows for a larger opening area of the pour opening 16 while still maintaining opening characteristics that the consumer is accustomed to with the standard LOE design.

As previously discussed, in the non-limiting example embodiment of FIGS. 1 and 1A, the easy pour spout 4 is formed by extending (i.e., enlarging) the pour opening 16 and, in particular the tear panel 10, at approximately the 6 o'clock position (e.g., without limitation, the bottom center from the top plan view perspective of FIG. 1) by a distance 30. More specifically, an additional enlarged portion 20 is added, which is preferably arcuate in shape and extends outwardly toward the periphery of the can end 2 (e.g., toward the center panel radius) by the additional distance 30, compared to conventional pour openings (not shown), which do not include any such extension or enlarged spout portion. In the example of FIGS. 1 and 1A, the enlarged portion 20 (e.g., extension) extends a distance 30 of about 0.035 inches. However, it will be appreciated that the easy pour spout 4 could have any known or suitable alternative size, shape, position and/or configuration, without departing from the scope of the disclosed concept.

For example and without limitation, FIG. 2 shows another non-limiting example of a can end 102 having an easy pour spout 104, in accordance with another embodiment of the disclosed concept, wherein the pour opening 116 has an arcuate enlarged portion 120 that preferably extends outwardly a distance 130 of about 0.070 inches at the 6 o'clock position (e.g., from the top plan perspective of FIG. 2), as shown. It

will be appreciated that, for reference, the rivet **114** is disposed at the 12 o'clock position (e.g., from the top plan perspective of FIG. 2). The can end **102**, like can end **2**, described previously hereinabove, may include any known or suitable tab **112**, and a scoreline **108** that defines the tear panel **110** in the end panel **106**. FIG. 3 shows another non-limiting example of a can end **202** having an easy pour spout **204**, in accordance with another embodiment of the disclosed concept. In the example of FIG. 3, the end panel **206** includes a scoreline **208** defining a tear panel **210** and associated pour opening **216** that has an enlarged portion **220** that preferably extends a distance **230** of about 0.140 inches. The can end **202**, like can ends **2,102**, described previously hereinabove, may include any known or suitable tab **212** that is staked by a rivet **214**, or otherwise suitably fastened, to the end panel **206**.

As best shown in FIG. 4, it will be appreciated that the center panel radius **240** limits the size of the easy pour spout **204** (see also easy pour spouts **4** and **104** of FIGS. 1 and 2, respectively) and, in particular, the amount by which the scoreline **208** defining the tear panel **210** can be extended outwardly (i.e., toward the periphery of the center panel **206**). For example and without limitation, in the embodiment of FIG. 3, wherein the distance **230** the enlarged portion **220** is extended is about 0.140 inches, the edge of the extended portion **220** is within a distance **250** from the tangency of the center panel radius **240**. In the non-limiting example of FIGS. 3 and 4, this distance **250** is between 0.015-0.020 inches. It will, however, be appreciated that any known or suitable alternative distance from the tangency of the center panel radius **240** could be employed, without departing from the scope of the disclosed concept. For example and without limitation, it will be appreciated that the end panel (e.g., **206**) could alternatively not have any de-boss or down panel at all at the 6 o'clock position (e.g., from the top plan perspective of FIG. 3).

In view of the foregoing, it will be appreciated that the increased area created by the disclosed easy pour spout **4,104,204** provides the necessary space for air to be entrained to help regulate (e.g., without limitation, equalize) the air pressure between the interior of the container (see, for example and without limitation, can **500** partially shown in simplified form in phantom line drawing in FIG. 1A) and the exterior of the container **500** (FIG. 1A). Consequently, disadvantages (e.g., without limitation, glugging; slow pour rate; intermittent pouring; splashing; excessive carbonation and foaming) of prior art designs are substantially addressed and overcome, and the pour characteristics of the can end **2,102,202** are improved. Testing of the disclosed concept has proven that significant reduction of glugging can occur depending on how much the primary pour opening is extended at the 6 o'clock position. A summary of test results is provided, for example and without limitation, in Table 1, below. Conventional ounce aluminum beverage cans were employed for the test.

TABLE 1

| Time (sec.) to dispense can using alternative primary pour apertures extended at the 6 o'clock position. | | | |
|--|------------------------|------------------------|------------------------|
| Control | LOE enlarged by 0.035" | LOE enlarged by 0.070" | LOE enlarged by 0.140" |
| 8.9 SEC. | 8.9 SEC. | 7.8 SEC. | 6.9 SEC. |
| 9.3 SEC. | 9.4 SEC. | 7.8 SEC. | 7.2 SEC. |
| 8.9 SEC. | 9.1 SEC. | 8.1 SEC. | 6.9 SEC. |
| 9.0 SEC. | 9.1 SEC. | 7.9 SEC. | 7.0 SEC. |

As shown in Table 1, the time it takes for fluid to be dispensed can be reduced by up to 2 seconds, or more, depending on the geometry selected. This is a significant improvement. As discussed hereinabove, among other benefits, the disclosed easy pour spout **4,104,204** creates space (e.g., airway passage) at the 12 o'clock position (e.g., near the rivet **14,114,214**) that would normally be substantially covered or filled with fluid. In other words, unlike a traditional LOE, when fluid is poured from the disclosed can end **2,102,202** the fluid does not cover the entire pour aperture **16,116,216**. This allows additional unencumbered air to entrain into the container **500** (FIG. 1A) that would normally be pulled through the fluid created by the vacuum when the fluid leaves container **500** (FIG. 1). Consequently, less glugging occurs, resulting in significant improvement of flow rate through the pour opening **16,116,216**.

FIGS. 5, 6 and 7 respectively show additional, non-limiting alternative example embodiments of can ends **302,402,502** having easy pour spouts **304,404,504**, in accordance with the disclosed concept.

FIGS. 5 and 5A, for example and without limitation, show an embodiment in accordance with the disclosed concept wherein the can end **302** includes a center panel **306** with a scoreline **308** defining a tear panel **310**, and a tab **312** fastened to the center panel **306** by a rivet **314**. However, the pour spout **304** has a relatively less significant or pronounced change in shape from the aforementioned pour spout embodiments (e.g., **4,104,204**). That is, the radius of curvature of the enlarged portion **320** of the tear panel **310** is generally the same as the radius of curvature of the remainder of the scoreline **308** and, therefore, the pour opening **316**. Nonetheless, the easy pour spout **304** provides an enlarged portion **320** at or about the outermost portion of the tear panel **310** or corresponding opening **316**, to enlarge the opening **316** at the 6 o'clock position (e.g., from the top plan perspective of FIG. 5).

FIGS. 6 and 6A, for example and without limitation, show a different embodiment in accordance with the disclosed concept, wherein the can end **402** includes a center panel **406** with a scoreline **408** defining a tear panel **410**, and a tab **412** fastened to the center panel **406** by a rivet **414**. However, the rivet **414** and/or the pour spout **404** and corresponding enlarged portion **420** of the tear panel **410** is/are vertically offset (e.g., without limitation, shifted upward from the top plan perspective of FIG. 6) with respect to the center of the can end **402** (e.g., from the top plan perspective of FIG. 6), by a distance **450**, as shown. The particular measurement of the offset distance, **450** is not intended to be a limiting aspect of the disclosed concept. It will also be appreciated that any such offset could alternatively be in another different direction (e.g., without limitation, downward; to the left; to the right (not shown)) or combination of directions (e.g., without limitation, upward and to the right; downward and to the right; upward and to the left; downward and to the left).

For example and without limitation, FIGS. 7 and 7A show a different embodiment in accordance with the disclosed concept, wherein the can end **502** includes a center panel **506** with a scoreline **508** defining a tear panel **510**, and a tab **512** fastened to the center panel **506** by a rivet **514**. However, the rivet **514** and/or the pour spout **504** and corresponding enlarged portion **520** of the tear panel **510** is/are laterally offset (e.g., without limitation, shifted to the right from the top plan perspective of FIG. 7) with respect to the center of the can end **502** (e.g., from the top plan perspective of FIG. 7), by a distance **550**, as shown. The particular measurement of the offset distance **550** is not intended to be a limiting aspect of the disclosed concept.

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A tooling assembly (not shown) for providing the aforementioned can end **2,102,202** and easy pour spout **4,104,204**, respectively, therefor, generally includes a number of tooling stations each including a first tool member and a second tool member disposed opposite the first tool member. The first and second tool members are structured to cooperate in order to form the can end having the aforementioned features. It will also be appreciated that a number of tooling stations and tool members therefor are employed within a conversion press to convert shells into finished can ends (e.g., without limitation, can end **2,102,202**) having the aforementioned pour spout **4,104,204** and other features, and the disclosed tab **12,112,212**, respectively, affixed thereto.

While specific embodiments of the disclosed concept have been described in detail, it will be appreciated by those skilled in the art that various modifications and alternatives to those details could be developed in light of the overall teachings of the disclosure. Accordingly, the particular arrangements disclosed are meant to be illustrative only and not limiting as to the scope of the disclosed concept which is to be given the full breadth of the claims appended and any and all equivalents thereof.

What is claimed is:

1. A can end comprising:

a center panel having a radius;
a tab fastened to the center panel; and
a scoreline defining a tear panel in the center panel, the tab being operable to sever the scoreline and open the tear panel to provide an opening in the can end,
wherein the tear panel includes an enlarged portion extending outwardly toward the center panel radius, thereby enlarging the opening to form an easy pour spout,
wherein the easy pour spout is disposed at or about an outer edge of the opening and substantially in the center of the outer edge of the opening,
wherein the enlarged portion comprises an arcuate extension portion having an edge,
wherein the edge of the arcuate extension portion extends toward the center panel radius by a predetermined distance,
wherein the outer edge of the opening is spaced apart from the center panel radius another predetermined distance,
wherein the easy pour spout and the center panel are made of a single unitary piece of material, and
wherein the tab is operable to pivot about a fixed location on the center panel in order to sever the scoreline and open the tear panel.

2. The can end of claim 1 wherein the predetermined distance the edge of the arcuate extension portion extends toward the center panel radius is between 0.02 inches and 0.15 inches.

3. The can end of claim 1 wherein the center panel includes a rivet; wherein the tab is fastened to the center panel by the rivet; and wherein the rivet is offset with respect to the center of the can end when viewed from a top plan perspective.

4. The can end of claim 3 wherein the rivet is vertically offset with respect to the center of the can end.

5. The can end of claim 3 wherein the rivet is laterally offset from the center of the can end, when the can end is viewed from the top plan perspective and the tab is disposed in its

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original, unactuated position extending longitudinally between the 12 o'clock position and the 6 o'clock position.

6. A container comprising:

a can body; and

a can end seamed to the can body, said can end comprising:

a center panel having a radius,

a tab fastened to the center panel, and

a scoreline defining a tear panel in the center panel, the tab being operable to sever the scoreline and open the tear panel to provide an opening in the can end,

wherein the tear panel includes an enlarged portion extending outwardly toward the center panel radius, thereby enlarging the opening to form an easy pour spout,

wherein the easy pour spout is disposed at or about an outer edge of the opening and substantially in the center of the outer edge of the opening,

wherein the enlarged portion comprises an arcuate extension portion having an edge,

wherein the edge of the arcuate extension portion extends toward the center panel radius by a predetermined distance,

wherein the outer edge of the opening is spaced apart from the center panel radius another predetermined distance,

wherein the easy pour spout and the center panel are made of a single unitary piece of material, and

wherein the tab is operable to pivot about a fixed location on the center panel in order to sever the scoreline and open the tear panel.

7. The container of claim 6 wherein the predetermined distance the edge of the arcuate extension portion extends toward the center panel radius is between 0.02 inches and 0.15 inches.

8. The container of claim 6 wherein the center panel includes a rivet; wherein the tab is fastened to the center panel by the rivet; and wherein the rivet is offset with respect to the center of the can end when viewed from a top plan perspective.

9. The container of claim 8 wherein the rivet is vertically offset with respect to the center of the can end.

10. The container of claim 8 wherein the rivet is laterally offset from the center of the can end, when the can end is viewed from the top plan perspective with the tab being disposed in its original, unactuated position extending longitudinally between the 12 o'clock position and the 6 o'clock position.

11. The container of claim 6, wherein the container is selected from the group consisting of beverage cans and food cans.

12. The can end of claim 1 wherein the predetermined distance the outer edge of the opening is spaced apart from the center panel radius is at least 0.015 inches.

13. The container of claim 6 wherein the predetermined distance the outer edge of the opening is spaced apart from the center panel radius is at least 0.015 inches.

* * * * *

UNITED STATES PATENT AND TRADEMARK OFFICE
CERTIFICATE OF CORRECTION

PATENT NO. : 9,254,945 B2
APPLICATION NO. : 13/973455
DATED : February 9, 2016
INVENTOR(S) : James A. McClung et al.

Page 1 of 1

It is certified that error appears in the above-identified patent and that said Letters Patent is hereby corrected as shown below:

IN THE SPECIFICATION

Column 1, line 6, "wider" should read --under--.

Column 3, line 12, "contains" should read --containers--.

Column 6, line 48, "distance, 450" should read --distance 450--.

Signed and Sealed this
Thirty-first Day of May, 2016

A handwritten signature in black ink, reading "Michelle K. Lee". The signature is written in a cursive, flowing style.

Michelle K. Lee
Director of the United States Patent and Trademark Office